C. MAPPING METHODOLOGY

This section explains the methodology and results for the mapping in this Plan Update.

STATE INFORMATION

Before discussing the methodology for the particular hazards, this section will explain the baseline data used for information on Louisiana as a state. Of overarching importance to data analysis is current knowledge of the people and land of the state, including its population, state property, and land cover information.

POPULATION

For population, U.S. Census data were used to calculate the percentage of population change for each parish from 2000 to 2010. In addition, 2010 Census data were used to display the current population size for each parish as well for the state of Louisiana.

STATE PROPERTY

The Louisiana State Land and Building System (SLABS) inventory is maintained by the Division of Administration pursuant to LA R. S. 39:11 and 13. The inventory maintains data relative to the fixed immovable property in which the State of Louisiana has a surface interest (SLABS is not a mineral interest inventory). The Louisiana State Land Office is responsible for maintaining this centralized inventory as currently and comprehensively as possible and practical.

The files are separated into three main categories: Facility/Site Summary data identified by the facility's SITE CODE Number; Individual Building data identified by the building's State I.D. Number; and Individual Conveyance data identified by the document's Site Code Number and Document Number. The individual building and conveyance data are linked to the facility/site data for that particular facility by the facility's Site Code Number. The electronic data files contain more detailed information for these three categories. As a result, these state properties were overlaid onto the 100-yr flood map to show which SLABS properties are vulnerable to possible flood risks associated in the state of Louisiana.

In terms of building damage of state-owned properties, this Plan Update focuses on properties that have been paid for repetitive claims. The State of Louisiana Office of Risk Management administers a cost-effective comprehensive risk management program for all agencies, boards, and commissions of the State of Louisiana and for any other entity for which the state has an equity interest, in order to preserve and protect the assets of the State of Louisiana. The office annually updates the replacement cost of state assets if a natural disaster (e.g., flood event) were to affect the property of interest. Each state asset found was then analyzed by its replacement cost and mapped onto the state of Louisiana. The repetitive loss amounts were divided into four categories: (1) < $1 million, (2) $1 million–10 million, (3) $10 million–100 million, and (4) > $100 million. Additionally, a cumulative sum by parish was calculated to determine the total repetitive loss amount based on a spatial scale.

For the Louisiana State Historic Preservation Office (SHPO) risk assessment (RA), this Plan Update selected 44 properties to be further investigated and analyzed for potential issues. However, the main focus of the SHPO RA portion of the study analyzes the possible natural hazards risk associated with each of the chosen properties. These 44 properties were superimposed over 100-yr flood risk areas, as well as tornado and hail density maps to understand possible risks associated with each property.

Land Cover

The Plan Update uses two national datasets to determine change in land cover. The National Land Cover Dataset 1992 (NLCD1992) is a 21-class land cover classification scheme that has been applied consistently across the lower 48 United States at a spatial resolution of 30 meters. The National Land Cover Database and 2001 and 2006 (NLCD 2001 and 2006) is a 16-class land cover classification scheme that has been applied consistently across the conterminous United States at a spatial resolution of 30 meters.

NLCD92 is based primarily on the unsupervised classification of Landsat Thematic Mapper (TM) circa 1990s satellite data. Other ancillary data sources used to generate these data included topography, census, and agricultural statistics, soil characteristics, and other types of land cover and wetland maps. NLCD1992 is the only NLCD dataset that can be downloaded by state and by user defined area from the MRLC Consortium Viewer.

NLCD2006 is based primarily on the unsupervised classification of Landsat Enhanced Thematic Mapper+ (ETM+) circa 2001 and 2006 satellite data. NLCD2006 also quantifies land cover change between 2001 and 2006. The NLCD2006 land cover change product was generated by comparing spectral characteristics of Landsat imagery between 2001 and 2006, on an individual path/row basis, using protocols to identify and label change based on the trajectory from NLCD2001 products. It represents the first time that this type of 30-meter resolution land cover change product is known to have been produced for the conterminous United States. A formal accuracy assessment of the NLCD2006 land cover change product occurred in 2011 It is expected to be released in early 2014.

A noticeable change is evident in the land cover type in the eastern and western parts of the state (especially in Livingston, Washington, St. Helena, Allen, and Beauregard Parishes) between 1992 and 2001. These parishes experienced a land classification change of more than 10% during a 5-yr period (2001–2006). In general, forested areas have been converted to agriculture, and urban classifications (or "cut-overs") have been reforested.

The Spatial Analysis for Conservation and Sustainability Lab at the University of Wisconsin produced wildland–urban interface (WUI) datasets based on land cover data across the United States. WUI data illustrate where the WUI was located in 1990, 2000, and 2010, which enables analysts to detect interface change (although this particular technique was not needed here). There are two main types of WUI: intermix and interface. Intermix WUI are areas where housing and vegetation are co-located, while interface WUI are areas with housing located adjacent to contiguous wildland vegetation. Other areas of the WUI surface include areas with varying levels of housing density (no housing, low density, medium/high density, low density with vegetation). The WUI for 2010 was mapped and the interface/intermix areas were the focal point. These are areas that could be more susceptible to wildfire.

CLIMATOLOGICAL HAZARDS

The data and approach for climatological hazards will be described in the risk assessment's order of hazards:

- Climatological Hazards
    - Droughts
    - Extreme Heat
    - Flooding
    - Thunderstorms (Hail, High Wind, and Lightning)
    - Tornadoes
    - Tropical Cyclones
    - Wildfires
    - Winter Weather

DROUGHTS

Drought information and maps were obtained from governmental sources such as the National Drought Mitigation Center.

EXTREME HEAT

The dataset for temperature contains spatially gridded average monthly and annual maximum temperature for the climatological period 1981–2010. Interpolation of the point measurements to a spatial grid was accomplished using PRISM (Parameter-elevation Regressions on Independent Slopes Model), developed and applied by Chris Daly of the PRISM Climate Group at Oregon State University. There are many methods of interpolating climate from monitoring stations to grid points. Some provide estimates of acceptable accuracy in flat terrain, but few have been able to adequately explain the extreme, complex variations in climate that occur in mountainous regions. Significant progress in this area has been achieved through the development of PRISM. PRISM is an analytical model that uses point data and an underlying grid such as a digital elevation model (DEM) or a 30-yr climatological average (e.g. 1981–2010 average) to generate gridded estimates of monthly and annual precipitation and temperature (as well as other climatic parameters). PRISM is well-suited to regions with mountainous terrain because it incorporates a conceptual framework that addresses the spatial scale and pattern of orographic processes. Grids were modeled on a monthly basis. Annual grids of temperature are produced by averaging the monthly grids. For the readability of this Plan Update, temperatures were converted from Celsius to Fahrenheit (i.e., raster calculator) in the following way:

- Divide the raster by 100 (raster was originally multiplied by 100 to allow for decimals to become whole integers - e.g., 20.04 became 2004)
- Multiply by 1.8
- Add 32

In terms of July temperatures, a latitudinal increase is described in the average maximum daily temperature for the state of Louisiana. The lowest (highest) average temperature was recorded along the coastline (northern and central) portion of the state at 86.8 º F (93.6º F). Heat advisory information given by the National Weather Service (NWS) was also used.

Flooding

The data are available from the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) and LOSCO Data Catalog, which consist of 1999 and 2012 flood zones. As a result, flood zones used in this project are focused on 100-yr flood zones.

The National Flood Hazard Layer (NFHL) data incorporates all Digital Flood Insurance Rate Map (DFIRM) databases published by FEMA, and any Letters Of Map Revision (LOMRs) that have been issued against those databases since their publication date. The DFIRM Database is the digital, geospatial version of the flood hazard information shown on the published paper Flood Insurance Rate Maps (FIRMs). The primary risk classifications used are the 1%-annual-chance flood event, the 0.2%-annual-chance flood event, and areas of minimal flood risk. The NFHL data are derived from Flood Insurance Studies (FISs), previously published FIRMs, flood hazard analyses performed in support of the FISs and FIRMs, and new mapping data where available.

The FISs and FIRMs are published by the Federal Emergency Management Agency (FEMA). The specifications for the horizontal control of DFIRM data are consistent with those required for mapping at a scale of 1:12,000. The NFHL data contain layers in the Standard DFIRM datasets except for S_Label_Pt and S_Label_Ld. The NFHL is available as state or U.S. territory data sets. Each state or territory data set consists of all DFIRMs and corresponding LOMRs available on the publication date of the data set. As a result, FIRM parcels classified as 100-yr flood (1%) were selected and further analyzed based on 2010 Census data and parish coverage.

An intersection was applied to consolidate attributes between the 100-yr flood zones in each parish. The area of each new polygon was calculated and then a summary was computed based on each individual parish. Next, a "spatial join" operation is used to determine the amount or area of each parish is affected or within the 100-yr flood zone.

A similar approached was used to determine the percentage of parish population located in a 100-yr flood zone except using 2010 U.S. Census data. An intersection was applied to consolidate attributes between the 100-yr flood zones and 2010 Census block data. Next, the area of each new polygon was calculated and then a "spatial join" operation was used to calculate the number of people or population found in each 100-yr flood zone and census block. Finally, a summarized count is made by each parish to determine the percent of parish population are located within the 100-yr flood zone.

Louisiana is prone to flooding. Most of the parishes that border a body of water are exposed to 100-yr floods. However, 13 parishes do not have current flood zone maps based on the data collected for this project.

THUNDERSTORMS

Similar to temperature, precipitation for Louisiana was obtained from the PRISM database at Oregon State University. The entire United States gridded precipitation normals (averages) for 1981–2010 were downloaded, and then only Louisiana was extracted. A graduated color scheme was used to illustrate gradations of high to low (relatively) precipitation across the state.

HAIL

These data are also available from NOAA's Storm Prediction Center (SPC) Severe Weather Database. The dataset consists of point attribute data from 1955-2012. All reports were selected to include only those natural hazards that occurred in Louisiana. Kernel density analysis, with a 25-mi. radius applied to each dataset, is used to approximate the density of hail reports based on diameter: (1) All sizes, (2) < 1 in., (3) 1-2 in., and (4) ≥ 2 in.

The highest density of hail reports is found in the northern part of the state, in particular with the largest number of reports occurring around Shreveport. An urban bias is still noted in the results but it is not as extreme when compared to tornado touchdowns and tracks. Strong maxima exist in northern Louisiana for all size intervals.

HIGH WIND

Thunderstorm wind events were obtained from the NOAA SPC and covered the time period between 1955 and 2011. The original file showed exact locations (coordinates) of high wind events. Data were aggregated to the parish level and then normalized by area. The resulting chloropleth map revealed the number of high wind events per 10 mi^2 in each parish.

LIGHTNING

Lightning density imagery was downloaded from the Global Hydrology Resource Center (a division of NASA. It was then georeferenced, rectified, and re-color coded for the state of Louisiana. No additional analyses were performed since the lightning densities were pre-defined to show the density of lightning flashes per mi^2 per year.

TORNADOES

The data are available from the SPC Severe Weather Database. The dataset consists of point and track data attributes from 1950–2012. All points and tracks were selected to include only those natural hazards that occurred in Louisiana. Kernel density analysis—with a 20-mi. radius applied to each dataset—is used to approximate the density of tornado touchdowns and tracks across the state.

The highest densities of touchdowns in the data are prominent in urban areas (i.e., Lafayette, New Orleans, and Shreveport) with highest occurrences developing in Lafayette. It is typical to see a bias toward metropolitan areas because of a higher population density and proximity to NWS Doppler radar locations. The highest densities of tornado tracks are also found in urban areas, although a distinct center is found in the northern part of the state. This may indicate that tornadoes in the northern parishes remain on the ground longer when compared to those in the southern part of the state.

TROPICAL CYCLONES

PRECIPITATION

The precipitation data—which are quality-controlled, multi-sensor (radar and rain gauge) precipitation estimates obtained from NWS River Forecast Centers (RFCs)—are available from Advanced Hydrologic Prediction Service (AHPS). The original data are in XMRG format and projected in the Hydrologic Rainfall Analysis Project (HRAP) grid coordinate system with a polar stereographic projection true at 60°N / 105°W. Software reads each participating RFCs XMRG file and retrieves the 24-hour precipitation estimate for each HRAP grid cell. Information on precipitation data for particular storms follows:

- Hurricane Katrina (2005)
    - Dates of data used (8/29/05–9/1/05)
    - Heaviest precipitation amounts are found in the southeastern part of the state, ranging from a few in. to more than 10 in.
- Hurricane Rita (2005)
    - Dates of data used (9/20/05–9/25/05)
    - The state was affected by the hurricane but the heaviest rainfall occurred along the landfall through the southwestern part of the state, where more than 10 in. fell.
- Hurricane Gustav (2008)
    - Dates of data used (9/1/08–9/5/08)
    - The central and northeastern part of the state received the heaviest rainfall, ranging from 10–20+ in.
- Hurricane Ike (2008)
    - Dates of data used (9/13/08–9/14/08)
    - The western part experienced a small amount of precipitation from Ike, ranging from 1 in. to several isolated areas receiving 7+ in.
- Tropical Storm Lee (2011)
    - Dates of data used (9/1/11–9/6/11)
    - Heaviest precipitation amounts were found in southeastern and east-central Louisiana, where totals exceeded 10 in.
- Hurricane Isaac (2012)
    - Dates of data used (8/29/12–9/3/12)
    - The highest amounts are observed along the stalled front of Isaac in southeastern Louisiana, with values ranging from 10–15 in.

Wind zone data were originally obtained from the LSU AgCenter, which mapped the wind zones based on building codes released in the ASCE 7-05 report. These building codes are primarily used to inform construction standards as they relate to hurricane-prone areas. The data were only available in web format so a process of digitization in 1 mph increments was implemented to map wind zones across Louisiana. The resulting layer was delineated based on 10 mph intervals with areas lower than 90 mph not further delineated. This is the threshold where buildings are not expected to withstand a strong hurricane and this area covered most of the northern half of Louisiana. Southeast Louisiana has historically been impacted by stronger hurricanes.

Wind observations used for the study were collected from three and six hourly surface wind data (0.05 º x 0.05º) from NOAA's Hurricane Research Division (HRD). This dataset is assembled from a variety of weather observations ranging from *in-situ*, marine, aviation, and reconnaissance aircraft data to remote sensing platforms. All wind data used by the HRD are quality controlled and processed to meet the wind height standard of 10 meters set by the World Meteorological Organization. Wind speeds are classified by the Saffir-

Simpson scale; spatial queries, intersections, and merges were used to consolidate and dissolve the observations into one shapefile for each tropical cyclone of interest to the project. Information on wind data for particular storms follows:

- Hurricane Katrina (2005)
  - Hurricane force winds were experienced by the eastern portion of the state with tropical storm winds extending outward to East and West Baton Rouge Parishes.
- Hurricane Rita (2005)
  - Hurricane and tropical storm strength winds are observed along the southern and southwestern parts of Louisiana.
- Hurricane Gustav (2008)
  - Hurricane force winds were experienced along the southern tip of Louisiana but a sizable portion of the state experienced tropical storm winds from Gustav.
- Hurricane Ike (2008)
  - Tropical storm force winds were recorded along the southern shorelines of Louisiana as the storm made landfall along the Texas coastline.
- Tropical Storm Lee (2011)
  - The southern part of Louisiana observed tropical storm strength winds prior to the tropical cyclone being classified as subtropical cyclone upon landfall.
- Hurricane Isaac (2012)
  - The southeastern part of Louisiana experienced tropical storm force winds before the system dissipated upon landfall after stalling out along the coast for two days.

The North Atlantic Hurricane Dataset (HURDAT) dataset was used to determine the tracks and intensities of North Atlantic that impacted Louisiana for the study period of 1851–2012. Each track contained in the database is comprised of six-hourly observations (0000, 0600, 1200, and 1800 UTC), longitude, latitude, maximum sustained wind, categorical strength based on Saffir-Simpson Hurricane Scale (SSHS), central surface pressure, and date as classified by the National Hurricane Center (NHC). The figures are broken down into intervals of 50 and 15 years for the project, as follows:

- 1851–1899: Thirty-two tropical cyclones made landfall across Louisiana.
- 1900–1949: Thirty-five tropical cyclones tracked across Louisiana.
- 1950–1964: Eleven tropical cyclones made landfall.
- 1965–1979: Eight tropical cyclones tracked across Louisiana—a quiet period; Hurricane Betsy.
- 1980–1994: Nine tropical cyclones tracked across Louisiana—a quiet period.
- 1995–2012: Seventeen tropical cyclones tracked across Louisiana, with several classified as major hurricanes (Saffir-Simpson category 3-5).

WILDFIRES

The data are available from the USDA Forest Service Active Fire Mapping Program. The dataset consists of point attribute data from 2001–2012. All reports were selected to include only those natural hazards that occurred in Louisiana. A 75% confidence interval was chosen to remove unlikely fire hazard detected by the MODIS satellite. Kernel density analysis with a 25-mi. radius applied to each dataset used to approximate the density of fire reports. More information follows below:

MODIS fire detection data for the current year (2012) are compiled by several sources, including: Terra and Aqua MODIS fire and thermal anomalies data generated from MODIS in near real-time direct readout data acquired by the USDA Forest Service Remote Sensing Applications Center, University of Wisconsin Space Science and Engineering Center, University of Alaska-Fairbanks Geographic Information Network of Alaska, the NASA Goddard Space Flight Center Direct Readout Laboratory, and NASA Goddard Space Flight Center MODIS Rapid Response System. These data are provided as the centroids of the 1km fire detections and are a composite dataset compiled from the listed sources. Direct readout products are subject to temporary system anomalies that may affect the acquisition of satellite data by one or all of the listed sources and, consequently, the completeness of this data product. GIS data are provided in ESRI shapefile and coverage formats and are updated hourly.

Four areas within the state are prevalent for fires. The highest densities are found along the western and southeastern parts of the state, where forestry and/ or agriculture is prominent, along with several national forests within the region.

WINTER WEATHER

Information on winter temperatures was gleaned from the same dataset used for extreme heat. The temperature data contains spatially gridded average monthly and annual maximum temperature for the climatological period 1981–2010. Measurements were interpolated using PRISM, and the grids were modeled on a monthly basis. Again, for the readability of this Plan Update, temperatures were converted from Celsius to Fahrenheit. A latitudinal decrease is evident in the average maximum daily January temperature for the state of Louisiana. The lowest (highest) average temperature was recorded in the northeastern (southeastern) portion of the state at 53.6 º F (63.4º F).

GEOLOGICAL/HUMAN-INFLUENCED HAZARDS

The data and approach for geological and human-influenced hazards will be described in the risk assessment’s order of hazards:

- Geological/Human-Influenced Hazards
    - Coastal Hazards
        - Coastal Erosion
        - Saltwater Intrusion
        - Sea Level Rise
        - Subsidence
    - Dam Failure
    - Earthquake
    - Levee Failure
    - Sinkhole

COASTAL HAZARDS

Because the Coastal Protection and Restoration Authority has primary jurisdiction over profiling and risk assessment for coastal hazards, most mapping was taken from pre-existing sources, as indicated in the coastal hazards part of Section Two. This Plan Update did develop its own mapping for saltwater intrusion

SALTWATER INTRUSION

The data are available from LSU Center for Geoinformatics (through Josh Kent), Louisiana Geological Society, and USGS Water Resources Investigations Report 90-4060. The data consist of point- and polygon-based formats to reveal the shape and size of salt domes currently in use or abandoned in Louisiana on- and off-shore. In addition, 2005 and 2006 Digital Orthophoto Quarter Quads (DOQQs) from LSU Atlas and LOSCO Data Catalog are used to show the infrastructure risks (e.g., road networks, emergency routes, gas and oil wells, and underground pipes) associated near the salt domes.

Four hundred and twenty-five salt domes are identified in Louisiana, with 272 of them offshore. The majority of salt domes are found along the southern shores of Louisiana with small percentage occurring in the northern part of the state. Salt dome examples include Bayou Corne (Assumption Parish), Jefferson Island (Iberia Parish), Black Bayou (Cameron Parish), and Winnfield (Winn Parish). All indications are that infrastructure would be affected if salt dome were to collapse because of human or natural forcing mechanisms.

DAM FAILURE

The final dams database was obtained from the Department of Transportation and Development – this included over 500 dams across the state. Dams were mapped according to hazard type (low, significant, or high). Other properties, such as build type, were not mapped.

EARTHQUAKE

Extensive earthquake data for Louisiana were not found on the USGS earthquake database, but instead on the National Geophysical Data Center website. “Louisiana” was selected within the Earthquake Intensity Database and 96 earthquakes were found and extracted to a table. The table included city location, latitude/longitude coordinates, time, date, and magnitude (Modified Mercalli). Each earthquake was mapped using a graduate symbol technique based on intensity and fault lines obtained from the National Atlas were also mapped.

LEVEE FAILURE

Leveed areas were originally obtained through a Web Map Service (WMS) from the U.S. Army Corps of Engineers. The WMS can be linked directly into ArcGIS and any layers within the chosen path database can be mapped. Additional layers were available, but leveed areas and the leveed areas outline were the only layers needed. Two different levee district levels were used to map levee districts. First, the New Orleans and Vicksburg districts were used to delineate sections of the Red River and Mississippi River that were controlled by each district. Next, sub-districts (i.e. divisions) within Louisiana were downloaded directly from the USACE website as a single shapefile and mapped to show the extent of each division.

SINKHOLES

Data on sinkholes is extremely limited and relatively unreliable, and thus no mapping was used for this Plan Update.

RISK AND VULNERABILITY

To better mitigate against disaster, this Plan Update collates information on risk and vulnerability to determine jurisdictional vulnerability to hazards, as well as the composite risk on state-owned properties.

Jurisdictional vulnerability maps were created for nine different hazards: winter weather, tornadoes, lightning, hurricanes, high wind, hail, flooding, levees, and dams. The same methodology was utilized for all natural hazard vulnerability maps (winter weather, tornadoes, lightning, hurricanes, high wind, hail, and flooding). For these hazards, the Spatial Hazard Events and Losses Database for the United States (SHELDUS) was utilized to create tables that included parish-level information for (1) number of events, (2) number of fatalities, (3) number of injuries, and (4) cost of damage from 1987 to 2012. The tables were then merged with a shapefile of Louisiana parishes for mapping purposes. Each of the four categories were mapped based on adapted intervals. Chloropleth maps were produced to show the four categories for each of the seven hazards.

Jurisdictional maps for levees and dams utilized various methods. For levees, state-owned properties from the SLABS database were mapped if they were located within the leveed areas defined by the U.S. Army Corp of Engineers. Parishes that contained, bordered, or touched a leveed area were also identified and mapped since these parishes would be vulnerable to levee failure. Census tract data containing building values (extracted from HAZUS-MH) were mapped if they contained, bordered, or touched a leveed area and a chloropleth map was produced based on potential loss estimation for these census tracts. The population of the same census tracts was also mapped using a chloropleth technique to illustrate population levels in each potentially impacted census tract.

For dams, each dam location (obtained from the Louisiana Department of Transportation and Development) was aggregated to the parish level, and each parish was mapped based on the number of dams that were located within its boundaries. Census tracts where dams were located were also mapped showing the population in each of these potentially vulnerable census tracts. Building values for the same census tracts were extracted form HAZUS-MH and also mapped using a chloropleth technique. To map repetitive claim properties potentially vulnerable to dam failure, the all-inclusive repetitive claims database was used in conjunction with the location of significant and high hazard dams. If a repetitive claim property was within three mi. of a significant hazard dam or five mi. of a high hazard dam, then they were extracted from the original repetitive claims database. Next, only those with a lower elevation within the specified radii were considered when mapping the top 10 repetitive claim properties vulnerable to dam failure.

Composite risk maps were created based on four major categories from the SHELDUS and the 2006–2010 Social Vulnerability Index (SoVI) for each parish. The four main SHELDUS categories included injuries, fatalities, property damage, and number of events. SoVI measures individual parish vulnerability to environmental hazards based on social, economic, demographic, and housing characteristics, which are mainly derived from U.S. Census Bureau data.

Each of the five categories was re-scaled to reflect their relative values for each hazard on a scale of zero to one. For example, if the highest “injuries” value was “2.73” and the lowest value was “0.04,” then all values were divided by the highest value (2.73). The highest value then becomes “1” and the lowest value becomes “0.01.” An additional step was taken to re-scale SoVI values since values were both positive and negative. All values were converted to positive values by adding the lowest value, resulting in a new lowest value of zero. For example, if the lowest value is -5.15 and the highest value is 6.08, then 5.15 is added to every value resulting in a new highest value of 11.23 and a new lowest value of zero.

Values were subsequently re-scaled between zero and one. After re-scaling, each of the five values were added together to create a final composite score. Categories were divided into five classes: “<1.0” is **Very Low**, “1.01–1.5” is **Low**, “1.51–2.0” is **Medium**, “2.01–2.5” is **High**, and

“>2.5” is **Very High**. A score of 2.5 or higher indicated that an average of 50% or more of the highest possible values in each of the five categories was surpassed. A score between 2 and 2.5 indicated that an average of ~40–50% of the highest values in each of the five categories was surpassed. A score between 1.5 and 2 indicated that an average of ~30–40% of the highest values in each of the five categories was surpassed. A score of between 1 and 1.5 indicated that an average of ~20–30% of the highest values in each of the five categories was surpassed. A score lower than 1 indicated that an average of 20% of the highest values in each of the five categories was not surpassed.